SUMMARY

OF THE

IMPROVEMENTS AND DISCOVERIES

IN THE

MEDICAL SCIENCES.

ANATOMY AND PHYSIOLOGY.

1. *New Process for Anatomical Injections*.—In a letter addressed to the Academy of Sciences, Paris, July 12, 1841, M. **Doyere** gives the following account:—I have employed, for nearly two years, a very simple process for obtaining fine injections. This process, which I believe likely to render some service to the anatomy of structure, and probably also to pathological anatomy, essentially consists in causing to enter in the same vessels, *within a certain interval of time*, two finely filtered saline solutions, which, by double decomposition, give an abundant and opaque precipitate. This succession of two injections is that which distinguishes my process from many others tried without success to obtain the injection of the capillary system by the same principle. I inject the second solution, as soon as the first has passed from the arterial system into the venous and lymphatic systems.

I have tried on animals a great number of insoluble salts, with a view to determine those which would give the most satisfactory results. I prefer to all others the chromate of lead. I first inject the chromate of potass, and am convinced that the order of injection is a point not to be neglected. A blue colour may be obtained by the precipitation of Prussian blue; brilliant red by iodide of mercury; white by the carbonate or sulphate of lead. The first has better succeeded with me than the carbonates and sulphates of lime and baryta.

The advantages which this process appears to me to possess over those in use, are above all to shorten the process of making fine injections, and to supersede any other preparation. It may be used with equal advantage cold or hot, in general or partial injection; the materials employed are unalterable, and may be consequently always ready. I will add, that the most minute injections required only a pressure which was evidently less than that of the heart's action. M. Poiseuille, to whom I made the process known several months since, in order that he might make use of it in his particular researches, has constructed an instrument by the assistance of which he can inject either liquid with that degree of pressure he considers proper.

By the assistance of this process, I have more than once succeeded in injecting by the femoral artery in a single operation, and in a few minutes, the capillaries of the muscular system in an entire animal, the adipose and cellular systems of the white and gray matter of the brain, of the conjunctiva, of all the mucous membranes, intestinal villosities, &c. The capillaries thus injected by the chromate of lead are more filled, especially after drying, than by the injections of size, but less than by those of varnish (*vernis*); there also remains some doubt in my mind relative to the actual diameter of the latter canals. Those which run parallel to each primitive muscular fasiculus, to the number of four or six, appeared to me to possess, in the dog, $\frac{1}{400}$th or $\frac{1}{300}$th of a millimetre; but it is possible that their dimensions had been reduced by the action of one or the other of the two solutions employed, or that they had not been sufficiently filled. I am now engaged in determining the relation which exists between the size of injected vessels, and their size during life.—*Microscopic Journal*, from *Comptes Rendus*, July 1841.

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2. *Anatomy of the Par Vagum and Nervus Accessorius.*—There is an interesting paper on this subject in the *Edinburgh Med. and Surg. Journ.* for Oct. last, by Jas. Spence, Esq.

It is well known that a considerable difference of opinion has of late existed among anatomists and physiologists regarding the exact functions of the par vagum; some maintaining that it is entirely sensiferous and incident, while others have maintained that it also contains a few motor filaments. Scarpa, Arnold, Bischoff, Valentin, &c., have asserted that all the motor filaments of the pharyngeal and laryngeal branches of the par vagum actually come from the spinal accessory; while Müller, John Reid, Volkmann, &c., maintain that a few motor filaments are bound up in the par vagum at its origin, though they admit that the greater number of the motor filaments found in the trunk of this nerve, as it lies in the neck, are derived from the spinal accessory. Mr. Spence has proved, by accurate and minute dissections, that a few of the filaments of the par vagum are non-ganglionic or motor, passing over the superior ganglion of this nerve, and joining themselves to the internal root of the accessory. The white nervous cord so formed by this junction can be traced down over the inferior ganglion of the vagus to which it gives one or two delicate filaments, and at last seems principally to pass into the formation of the inferior laryngeal nerve.—*Lond. and Edin. Month. Journ. of Med. Sci.* Nov. 1842.

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3. *On the Influence of Lactation in preventing the recurrence of Pregnancy.* By T. Laycock, M. D., Physician to the York Dispensary.—The influence of lactation, in preventing the recurrence of pregnancy, has never yet been fairly estimated. It is generally taken for granted, indeed, that pregnancy will not occur during lactation, as well as that prolonged lactation must be injurious to the health. Neither of these opinions are strictly correct.

Mr. Roberton of Manchester made inquiries of 100 married females, and ascertained that one-half, or 50 per cent. conceived during lactation. Mr. Roberton, however, did not ascertain how often pregnancy took place during suckling—an important fact to be known, as will be seen from the following inquiries I have made on this subject.

As it has been objected to Mr. Roberton's inquiries, that they were made amongst the lower or labouring classes of a manufacturing town, I wrote to one or two professional friends, in agricultural districts, to request their assistance; while, at the same time, I made inquiries in York, where the population can be considered neither manufacturing nor agricultural. Inquiries were made of 135 married females, with the following results:—209 pregnancies took place during 766 lactations, or at the rate of 1 in 3.66, or about 27 per cent.

The 209 pregnancies occurred in 76 females as follows:—

No. of Females.	No. of Children.	No. of times pregnant during lactation.	Average.
30	163	30	1 in 5.4
12	65	24	1 in 2.6
10	78	30	1 in 2.6
13	93	52	1 in 1.8
3	25	15	1 in 1.6
4	29	24	1 in 1.2
2	14	14	1 in 1
2	25	20	1 in 1.2
76	492	209	1 in 2.36

The average duration of lactation in the 135 females was 13 months nearly;

of the 76 it was 14.4 months. It will be seen, that in 30 of the 76 who became pregnant during lactation, pregnancy so occurred only once; so that, for practical purposes, these might be deducted. This reduces the number of females who conceived while suckling, to 46, or 33.9 per cent., being nearly 1 in 3. This is below Mr. Roberton's estimate. If, however, the whole number be taken, the proportion is 56 per cent., being higher than Mr. Roberton's estimate. From the inquiries I made, it appeared very evident that there were two classes of females. In the one, the pregnancy during lactation was the rule; in the other the exception. Of the former class there appear 19 only in the 135, or 1 in 7. These 19 females averaged five children each; nine of them had 46 children, and always became pregnant during lactation; ten had 48 children, and each of the ten escaped, becoming pregnant only once during lactation. The period of lactation, at which pregnancy took place, varied from three months to two years. The average in 108 instances was 12½ months. The average age of 135 females at the time of marriage was 22 years; the average number of children weaned 5.7. Some remarkable cases occurred to me in the course of my inquiries. One individual had an infant at the breast during the whole period of pregnancy, and continued lactation after parturition; so that she had two nursing at once. Another female in a village near York, gave the breast to one of her sons until he was eight years old, and a strapping fellow he was at five-and-twenty, when I saw him. The same person nursed three children for two years each.

She never became pregnant during lactation. Neither did another female who nursed three children for two years, and four for a year and a half. Another individual who had six children had always the catamenia during lactation, but never became pregnant before weaning. To the inquiry as to the state of the health during lactation, the answer was almost invariably "good." Often the individual observed, that she was always in the best health while nursing.

Having been assisted in these inquiries by several professional friends, I could not trespass upon their time by requesting answers to a numerous set of questions. In any future inquiries, the condition in life should be actually discriminated, and the state of health, where pregnancy occurred during lactation, particularly inquired into. My own opinion is, that where this occurs *as an exception*, it will be found the health of the individual has been below *par;* so that lactation has been irregularly performed. It is not unlikely, indeed, that the great fecundity amongst the lower classes, and also the fecundity observed after a famine or destructive epidemic, may be dependent upon this preponderance of the ovarian over the mammary influence. I believe, however, where pregnancy during lactation *is the rule*, there will be rather a full state of health, the feminine characteristics of the individual strongly marked, and great fecundity. This peculiarity of the female seems hereditary. I traced it to the third generation in one family, and to the second in three or four. It is an interesting subject for further inquiry.—*Dublin Medical Press*, Oct. 26, 1842.

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4. *Additional Remarks on Fibrine.* By MARTIN BARRY.—On examining coagulated blood, Dr. Barry finds that it contains discs of two different kinds; the one comparatively pale; the other very red. It is in the latter discs that a filament is formed; and it is these discs which enter into the formation of the clot; the former, or the pale discs, being merely entangled in the clot, or else remaining in the serum. He thinks that the filament escaped the notice of former observers, from their having directed their attention almost exclusively to the undeveloped discs which remained in the serum, and thus conceived that the blood-discs are of subordinate importance, and are not concerned in the evolution of fibrine.

To render the filament distinctly visible, Dr. Barry adds a chemical re-agent capable of removing a portion of the red colouring matter, without altogether dissolving the filament. He employs for this purpose chiefly a solution of one part of nitrate of silver in 120 parts of distilled water; and sometimes also the chromic acid. He admits that the use of these re-agents would, on account of their destructive tendency when concentrated, be objectionable as proofs of the absence of any visible structure; but as the point to be proved is, that a certain specific structure does exist, he contends that the same appearance would not equally result from the chemical actions of re-agents so different as are those of chrome and the salts of mercury and of silver. After the appearance of the filament, thus brought to light, has become familiar to the eye, it may be discerned in the blood-discs when coagulation has commenced, without any addition whatever. Those blood-discs of the newt, which contain filaments, often assume the form of flask-like vesicles, the membranes of which exhibit folds, converging towards the neck, where, on careful examination, a minute body may be seen protruding. This body is the extremity of the filament in question, its protrusion being occasionally such as admits of its remarkable structure being recognised.

The author proceeds to describe various appearances which he has observed in the coagulum of the blood, and which strongly resemble those met with in the tissues of the body, and are obviously referable to a similar process of formation. He bears testimony to the accuracy of the delineations of coagulated blood given by Mr. Gulliver. One of the most remarkable phenomena discovered by the author in the coagulation of the blood is, the evolution of red colouring matter—a change corresponding to that which he had previously observed to take place in the formation of the various structures of the body out of the corpuscles of the blood. He considers the production of filaments as constituting the essential circumstance in coagulation.

He conjectures that the notched or granulated fibres noticed in the blood by Professor Mayer, may have been of the same kind as the flat, grooved, and compound filaments described by himself; but he thinks that in that case, Mayer's explanation of their mode of origin must be erroneous; for they may be seen to be produced by a portion of the blood not mentioned by him—namely, the corpuscles.

Mr. Addison's discovery of globules in the uppermost stratum of inflammatory blood, and of their influence in the formation of the buffy coat, is confirmed by Dr. Barry, who remarks that these globules are altered red blood-discs. That the blood corpuscles are reproduced by means of parent-cells, as suggested by Mr. Owen and by the author, is confirmed by the observations of Dr. Remak; but the author had long ago indicated a division of the nucleus as being more particularly the mode of reproduction, not only of those corpuscles, but of cells in general. With this conjecture the observations of Remak on the blood-corpuscles of the fœtal chick fully accord. Whether the author's further speculation—namely, that the parent-cells are altered red blood-discs, is correct, still remains to be seen.

The phenomenon of the "breaking off short," or notching of the fasciculus of a voluntary muscle in a transverse cleavage of the fibre, is regarded by Dr. Barry as a natural consequence of the interlacing of the larger spirals, which he has described in a former paper; the fracture, in proceeding directly across the fasciculus, taking the direction in which there is least resistance.

The position of the filament in the blood-corpuscle is represented as bearing a striking resemblance to that of the young in the ovum of certain intestinal worms, the filaments of which are reproduced by spontaneous division. The author subjoins the following quere, "Is the blood-corpuscle to be regarded as an ovum?"—*Proceedings of Royal Society.*

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5. *Minute Anatomy of the Spleen.*—M. Bourgery, who has recently devoted much time to microscopic investigations of the minute anatomy of the frame, having examined a large number of human and other spleens, states that they consist of vesicular membranes, blood-vessels, floating vascular corpuscles, a granulo-capillary apparatus, (champ granulo-capillaire,) a splenic fluid, splenic glands, lymphatic vessels, nerves, cellular tissue, and an enveloping membrane. The first five of these compose the vesicular apparatus, the sixth and seventh the glandular, and the last three the general texture of the organ.

The splenic vesicles are found in every part of the spleen, separated by membranous walls, and of a spheroid or ovoid shape when the spleen is fully injected, of an irregular poly-hedral figure of from five to ten sides, when the organ is inflated. The former is probably the true shape, as during life the liquids fill the vesicles, glands, and vessels. They vary much in volume, not only in different animals, but in the same spleen. In man they are smaller and more regular. In general, their medium diameter is from one to one and a quarter of a millimetre, and they do not vary one-third of this dimension more or less. These vesicles do not form simple cavities, being traversed by vessels covered with the enveloping membrane, which form crescentic folds to the extent of one-third, one-half, or the entire diameter of the vesicle, by which a series of subdivisions of the cavity are formed, at the bottom of which are found the glands, granules, and capillary arborisations in relief. They have two kinds of orifices, one of communication, *inter se*, which is irregularly circular, with its edges formed by a fold or reflected membrane from the parietes. The larger vesicles have two or three, the smaller ones have one at least, this free communication between the vesicles enabling the anatomist readily to inflate the organ not only by the veins, but by any opening made on its external surface. The orifices of communication with the veins are not so numerous as those just described; some vesicles will have two or three, while several others close by have not one between them. These orifices are circular or ellipsoid, and possess an incomplete crescentic valve. They are about one-twelfth of a millimetre in diameter in man. They form the absorbent mouths of veins of the same size, which are connected with those of the intervesicular spaces.

The intervesicular spaces are formed by the separation of the enveloping membranes, and contain the vessels and splenic glands; their size depends on the degree of repletion of the vesicles. These spaces are enlarged irregularly between several vesicles, and are filled with glands.

The enveloping membrane constituting the parietes of the vesicles, is one continuous membrane throughout the entire extent of the spleen, and may be regarded as divided into a number of small isolated ampullæ, and supported by the ramifications of the vessels and by the glands. The organisation of the vesicular membrane is very complicated, as it encloses the granulo-vascular membrane with its thick network of blood-vessels and lymphatics.

M. Bourgery divides the blood-vessels into three orders—the splenic, intervesicular, and the vesicular. The splenic artery and vein divide into three or four branches, which pass directly to the surface of the organ; the veins, which are much the larger, are pierced with a number of small foramina, opening into the venulæ of the spaces; the terminal veins according to the length of their canals, end in a succession of cellules, separated by vascular bands, the organic composition of which is absolutely identical with that of the vesicles in which they terminate. The intervesicular vessels, arising from the preceding, are distributed to the glands and intervesicular membrane in the spaces. The vesicular vessels form the falciform folds already spoken of in the interior of the vesicles. Their branches project into the cavity to be distributed to the floating vascular corpuscles, resembling a bunch of grapes. On the fundus of the membrane, the terminal capillaries form the granulo-vascular network with the lymphatics. There are two kinds of veinules, the capillicules of the common network, and the veinules of absorption, which are much larger than those that open into the vesicular cavities. All the small vessels of the spleen, whether of the spaces or vesicles, are distinguished, when distended, by a continued series of swellings and contractions, which give them a well-marked knotted aspect.

The floating vascular corpuscles are contained in the interior of the vesicular cavities, where they depend, as from a pedicle, from the terminal branches of the capillary lymphatics and blood-vessels. They are formed by a lenticular nucleus, whence spring in the turgid state, small aigrettes radiating towards the circumference. These aigrettes are composed of a filament terminated by small brilliant spherules, collected in the form of a chaplet. The corpuscular nuclei are of unequal shape, and about fifteen to sixteen times the size of the diameter of the blood globules, and their capillaries have a calibre of 3.100 of a millimetre.

The granulo-vesicular membrane is composed of two elements: first, of pale spherical granules in juxtaposition, equal in diameter to four or five globules of blood, and of arterial, venous, and lymphatic capillaries. The splenic liquid or blood appears to be the product of elaboration by the floating corpuscles and the granulo-vesicular membrane; it is deposited in the vesicular cavities, whence it is taken up by the absorbent veins of its parietes. It is thick, viscid, of a reddish brown colour, and under the microscope it appears to be composed of several kinds of globules held in suspension in a yellowish and unctuous liquid—viz., lenticular globules—some red, which do not appear to differ from the ordinary blood globules, others colourless, and whitish irregular globules, resembling those met with in the chyle and lymph.

The splenic glands united by cords of the same substance, with the ramifications of the vessels, fill up the intervesicular spaces; their greatest diameter in a state of repletion is about a quarter of a millimetre in man. In a bullock's spleen, where they are about two millimetres in diameter, they can be seen with the naked eye in the form of brown or whitish corpuscles. M. Bourgery believes these to be the glands spoken of by authors as the vesicular glands of Malpighi. These glands isolated or agglomerated in the spaces according to their size, are united by their cords into the form of chaplets, and receive a great number of lymphatics and blood-vessels. When magnified to 200 or 500 diameters, they appear to consist of granules and infinitely small capillaries. The lymphatics form a network on the surface of the gland, whence an afferent vessel penetrates its substance, subdivides into innumerable ramusculæ, forming the principal part of the gland, and terminating in an efferent vessel, which passes to the vessels of the intervesicular space. From these facts, M. Bourgery concludes them to be microscopic lymphatic glands. The microscopic lymphatic vessels arise from the granulo-capillary membrane, where they form a very close network; they unite to compose fifteen to twenty larger trunks, which enter the glands of the spaces. Their diameter is from 5. to 8.100 of a millimetre. The larger branches are provided with valves, and have enlargements, which at the points of anastomosis, resemble rudimentary glands, as if they were not only vessels for carrying the lymph, but also bore a part in its elaboration.

According to Malpighi, the spleen was composed of cellules separated by spaces; in the cells existed granulations pendent from the extremities of the arteries and nerves. The veins and arteries opened into the cellules by gaping orifices. The spaces were formed by a parenchyma, formed of fibrous and muscular bands, and contained a thickened and extravasated blood. Ruysch admitted the existence of the membranes, but denied that of the fibres and cellules, and assigned another use to the granulations. Winslow spoke of a cottony tissue, and admitted the cellules and granulations, but did not allude to the vascular capillaries. Haller acknowledged only the cellules and granulations; a little later Assolan denied the existence of the cellules, and still later Meckel wrote against the cellules, and Cruveilhier against the granulations in man.

From these details, it appears that the spleen is composed of two distinct apparatuses, the vesicular and the glandular, divided into little organules, in juxtaposition throughout the entire organ. Of these, the vesicular apparatus constitutes three-sixths of the spleen; the glandular two-sixths; the remaining one-sixth being formed by the vascular arrangement. The vesicular apparatus or succession of vesicles, is continuous throughout, *inter se* by orifices of communication, and comprises the splenic veins, the corpuscles, and the granulo-capillary membrane. It constitutes a long canal, everywhere folded on itself, and divided by vascular bands into myriads of little cavities to increase the surfaces. The texture of these vesicles and the nature of the liquid they contain cause them to be regarded as an apparatus for the elaboration of blood.

The glandular apparatus is composed of glands and lymphatic vessels. It consists of a tortuous chain of glandules connected by cords of the same substance, and situated between the vesicular ampullæ. It may be regarded as one large lymphatic gland, broken down into smaller ones, in order to surround the vessels throughout the entire extent of the spleen. The capillary blood-vessels assimilate somewhat in texture to the organ itself, the veins forming part of its tissue, and participating in its functions, while the lymphatics appear to be not merely vessels for transmitting the lymph, but at the same time organs for elaboration. The anatomical arrangements are the same throughout the mammiferæ, but in man they are more precise and defined, marking the perfection of the organ, which is much more simple in its organisation in animals.—*Prov. Med. Journ.*, Oct. 1, 1842, from *Gazette Méd. de Paris*, June 1842.

6. *Nature of the fat substance of Milk.*—M. Romanet asserts that the globules of the milk are entirely formed of butter, which exists as a pulp enveloped in a white, translucent, elastic, and resistant pellicle; and that this cyst is broken in churning, by which the butter is allowed to escape, and the pellicles floating about separately constitute the white particles which give consistence to the buttermilk.—*Comptes Rendus*, April 4, 1842.

7. *Virey's Objections to* LIEBIG'S *Theory of the Uses of Respiration and of Food.*—Liebig maintains that the chief use of the food is to supply carbon and hydrogen, which, uniting with the oxygen absorbed from the air, give rise to the generation of animal heat. He consequently holds that there is a certain fixed relation between the amount of food consumed, and the quantity of carbon and hydrogen thrown off at the lungs. M. Virey opposes this theory, as contrary to common observation, as, even though it be allowed to be applicable to mammalia, birds, and reptiles, it is by no means to those animals which respire by means of branchiæ. Thus all animals with branchiæ consume but little oxygen, comparatively speaking, and yet many of them devour very great quantities of food. Even the largest and most voracious of the reptiles, as the alligators, crocodiles, &c., which devour enormous quantities of food, under a burning climate too, respire feebly with their vesicular lungs, and consume but little oxygen.

Fishes, whose blood is but imperfectly oxygenated by the branchial apparatus, are perhaps among the most voracious of animals, and yet, according to Liebig's theory, they ought to eat little, because they consume little oxygen.

The same holds true of the Mollusca. The cuttle-fish, *buccinum*, *strombus*, *murex*, &c. grow to a large size; but their respiration is very imperfect, and yet they are great flesh-eaters. The Crustacea, again, as the crabs, lobsters, &c., grow rapidly, because they are great eaters; but their branchial apparatus is not fitted to consume much oxygen.

In all these animals assimilation takes place very rapidly, notwithstanding their feeble respiratory powers; and they are, besides, by no means deficient in activity or muscular powers, though their flesh be but feebly azotized or animalized, and their blood is always cold.

If it be one of the characters of vitality, that the more perfect this principle is, the greater is the number of germs, or eggs, or fœtuses produced, then, quite contrary to Liebig's theory, the number of germs produced is in the inverse ratio of the perfection of the respiratory functions. Fishes and mollusca deposit their spawn or eggs by millions; but the mammalia, and even the birds, whose respiratory functions are the most perfect, are in this respect infinitely behind these. On the other hand, it is seen that the number of germs or eggs is rather proportioned to the nutrition received; for the amount of food taken is not proportioned to the respiration in the animal kingdom.

M. Virey therefore concludes, that the vital force or central nervous energy has more to do with the production of animal heat than the consumption of carbon at the lungs, and this for three special reasons;—1st, Because a fecundated egg resists a freezing temperature longer than one which has not been fecundated. 2d, That a hybernating insect, reptile, or animal, or even trees during winter, by the sole influence of a vital power, resist a freezing temperature, whereas the same animals, if dead, would be instantly frozen. 3d, That many mammalia and birds keep themselves warm even in the most rigorous winters under the Pole, not in consequence of a greater amount of oxygen consumed, nor by a greater amount of muscular activity, but in consequence of a more abundant highly azotized or animalized nourishment.—*Journ. de Pharm.*, *May*, 1842.